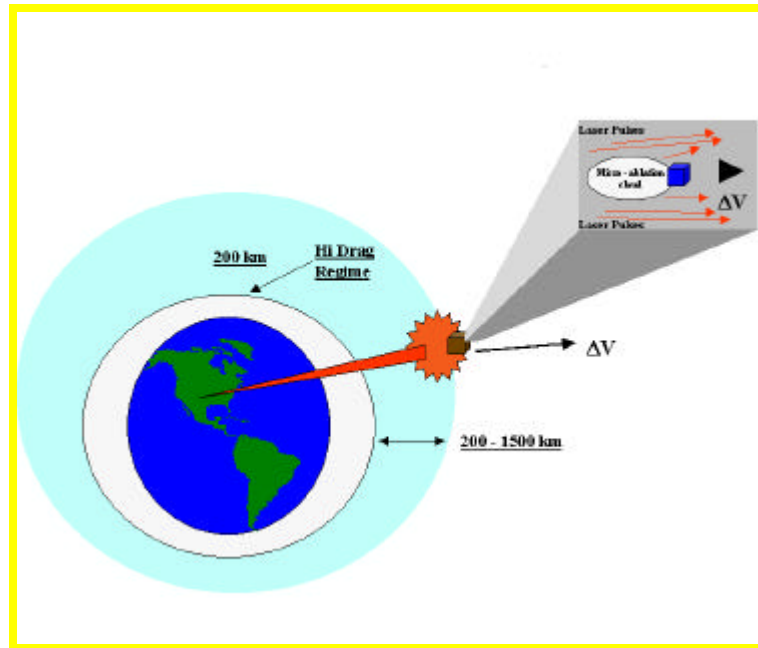




Demonstration of Ground LIDAR System to Sense and Track Orbiting Object



Objective

This effort will demonstrate that current laser, radar, and optical technology is sufficiently mature to detect, acquire, handoff, track, and engage 1-10 cm orbital debris between 200 and 1500 km in altitude at various inclinations. This is an important step toward demonstrating actual removal of space debris by lasers. The specific objective of this proposal will be to design, develop, and fabricate flight ready spheres which can be released on-orbit as targets for ground based tracking systems. An overall plan to fly these spheres and demonstrate the capability of Air Force tracking and laser systems to target them will be developed in conjunction with our collaborators.

Why Needed

Multiple articles have been recently written raising the concern of risk of collision to orbital assets posed by orbital debris. In recent years, numerous Shuttle ports have been damaged and in 1997 a French satellite was severely damaged by a collision with orbital debris. A feasibility study released as the Orion report assessed the use of a ground-based laser/sensor for removing 1-10 cm orbital debris with excellent results. There is an estimated 150,000 particles between 1-10 cm in the altitude region of 200 – 1500 km with average closing velocities of 10 km/s. This size regime is generally too large for effective shielding and too small for conventional detection/maneuver mitigation, and current assessments indicate that this debris population is increasing linearly. Laser orbital debris has now been recognized as a technological stepping stone to deflecting asteroids, meteoroids, and comets, and provides an effective means in detecting and eliminating orbital debris. Meetings between NASA and the Air Force have resulted in an informal agreement that the Air Force would provide the Advanced Electro-optical System (AEOS) facility on Maui if NASA would provide the hitchhiker and calibrated target balls.

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Sponsor

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